Attachment I

PACIFIC GAS AND ELECTRIC COMPANY
STATION CONSTRUCTION DEPARTMENT
DIABLO CANYON PROJECT

Unit 1

TEST PROCEDURE NO. 44.2

SPECIAL LOW POWER TEST PROGRAM

CVCS CHARGING AND LETDOWN COOLDOWN CAPABILITY

FOR INFORMATION ONLY

Prepared by/Date Brian LoConte 5/15/80 Startup Engineer

Approved by/Date _____ Lead Startup Engineer

_____ Plant Superintendent

Performed by/Date _____ Startup Engineer

_____ Plant Superintendent

Approved by/Date _____ Lead Startup Engineer

Accepted for Operation by/Date _____ Plant Superintendent

Distribution: Power Plant Superintendent (4) Resident Civil Engineer (1)
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Startup Files: Red _____
Green _____

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CLASS-I

PACIFIC GAS AND ELECTRIC COMPANY
STATION CONSTRUCTION DEPARTMENT
DIABLO CANYON PROJECT

UNIT 1

TEST PROCEDURE NO. 44.2

SPECIAL TEST - CVCS CHARGING AND LETDOWN COOLDOWN CAPABILITY

1.0 TEST PURPOSE

To determine the cooling capability of the charging and letdown system with the secondary plant isolated.

2.0 TEST DESCRIPTION

Reactor conditions of approximately 540°F and 2235 psig will initially be established. Three of the four reactor coolant pumps will be tripped and the steam dump to the main condenser will be used to maintain no-load steam generator pressure (~1005 psig). The steam generators will then be isolated. The cooldown capability of the CVCS charging and letdown system will be determined from the hot and cold leg temperatures of the active loop at maximum flow (120 gpm)and minimum flow (45 gpm).

In addition, core exit thermocouples will be monitored to assess core flow distribution.

3.0 REFERENCES

3.1 Piping Schematics:

a)	Turbine Steam Supply System	102004-8
b)	Reactor Coolant System	102007-7
c)	Chemical and Volume Control System	102008-8

3.2 Instrument Schematics:

a)	Flow Instrument Systems	102032-8
b)	Pressure Instrument Systems	102034-8
c)	Temperature Instrument Systems	102035-8
d)	Multivariable Instrument Systems	102036-7

3.3 Startup Test Procedure 40.0, "Program Outline Initial Core Loading, Initial Criticality, Zero Power Physics and Power Escalation."

3.4 Diablo Canyon Nuclear Design Report DC 663277-17-2

3.5 Diablo Canyon Unit 1 Plant Technical Specifications

3.6 Diablo Canyon Plant Manual

3.7 Diablo Canyon FSAR

4.0 PREREQUISITES

4.1 The General Construction (G.C.) and Nuclear Plant Operations (NPO) Personnel observing/participating in this test procedure have been briefed on the objectives, general procedure steps, and precautions of this test procedure. _____

4.2 The appropriate step of Startup Test Procedure 40.0, "Program Outline Initial Core Loading, Initial Criticality, Zero Power Physics and Power Escalation," has been reached. _____

4.3 Safety Injection signals blocked as detailed in Appendix B. _____

4.4 Visicorder(s) set up to monitor the following data:

NOTE: 1. Label each trace with date, time, recorder speed, parameter measured, scaling units, and input signal source.
2. For each special test instrument and permanent plant instrument used in this test procedure, supply the data asked for on the attached TEST INSTRUMENT LIST and verify calibration.

a)	Charging Flow	FM 128	Output	_____
b)	Letdown Flow	FD/134	Output	_____
c)	Hot Leg Temperature			
	Loop 1	TM413A	Output	_____
	Loop 2	TM423A	Output	_____
	Loop 3	TM433A	Output	_____
	Loop 4	TM443A	Output	_____
d)	Cold Leg Temperature			
	Loop 1	TM413B	Output	_____
	Loop 2	TM423B	Output	_____
	Loop 3	TM433B	Output	_____
	Loop 4	TM443B	Output	_____

e) Regenerative heat exchanger outlet temperature
Charging Side TM 126 Outlet ____
Letdown Side TM 127 Outlet ____

4.5 Steam generator chemistry is such that blowdown may be terminated when the steam generators are isolated. ____

4.6. The auxiliary boiler is in service and available to supply steam where required when the main steam isolation valves are closed. ____

4.7 At least one of the source range channels set up to NR-45 so that any changes in the core flux level can be monitored. ____

5.0 INITIAL CONDITIONS

5.1 The reactor is shutdown and borated to ensure adequate shutdown margin..

5.1.1 NPO has performed a shutdown margin calculation (STP R-19). ____

5.1.2 Record the boron concentration used in the above calculation (this should be the most recent RCS boron concentration). ____ppm

5.1.3 Verify that the concentration recorded above is greater than 783 ppm. ____

5.2 All four reactor coolant pumps are in operation. ____

5.3 Steam generator level being maintained at approximately 33% (narrow range) with the Auxiliary Feedwater System motor driven pumps. ____

5.4 Reactor coolant system pressure and level under automatic control at approximately 2235 psig and 22% respectively. ____

5.5 Reactor coolant system temperature being controlled at approximately 540°F by steam dump to the condenser under automatic pressure control. (Steam generator pressure at approximately 948 psig.) ____

5.6 Letdown at a rate of 120 gpm, and charging at a rate to maintain pressurizer level. ____

5.7 The following parameters being monitored on the P-250 trend printer:

a) Wide Range Temperature

	Loop 1	Loop 2	Loop 3	Loop 4
T_{hot}	T0419A_____	T0439A_____	T0459A_____	T0479A_____
T_{cold}	T0406A_____	T0426A_____	T0446A_____	T0466A_____

b) Pressurizer Pressure (Only one of the channels selected for pressure control at control console selector switch need be monitored).

Channel 1	Channel 2	Channel 3	Channel 4
P0480A_____	P0481A_____	P0412A_____	P0483A_____

c) Pressurizer Level (Only the channel selected for level control at control console selector switch need be monitored).

Channel 1	Channel 2	Channel 3
L0480A_____	L0481A_____	L0482A_____

d) Steam Generator Level (Narrow Range)

S/G 1-1	S/G 1-2	S/G 1-3	S/G 1-4
L0400A_____	L0420A_____	L0440A_____	L0460A_____

e) Steam Generator Pressure

S/G 1-1	S/G 1-2	S/G 1-3	S/G 1-4
P0400A_____	P0420A_____	P0440A_____	P0460A_____

f) Reactor Coolant Seal Water Inlet

RCP 1-1	RCP 1-2	RCP 1-3	RCP 1-4
F0435D_____	F0436D_____	F0437D_____	F0438D_____

g) Reactor Coolant Seal 1 Leakoff (wide range)

RCP 1-1	RCP 1-2	RCP 1-3	RCP 1-4
F0406D_____	F0407D_____	F0408D_____	F0409D_____

h) Volume control tank outlet temperature T0140A_____

5.8 Place the following atmospheric steam dump control valves in "manual" mode.

S/G 1-1	S/G 1-2	S/G 1-3	S/G 1-4
PCV 19 _____	PCV 20 _____	PCV 21 _____	PCV 22 _____

5.9 Arrange to have incore thermocouple data printed upon request. _____

6.0 TEST INSTRUCTIONS

CAUTION: The system configuration for this test is an abnormal mode. The participants of this test procedure should therefore be alert to any unanticipated events that may occur during the course of this test, and react in accordance with existing emergency and normal operating procedures. Appendix A lists the Technical Specifications exceptions for this test.

CAUTION: An operator initiated safety injection should be performed only for one or more of the following conditions:

a)	Reactor Coolant System Subcooling	≤ 10°F
b)	Sudden Unexplained Decrease in Pressurizer Level of	10%
	or to an Indicated Level of	≤ 10%
c)	Sudden Unexplained Decrease in Any S/G Level to	≤ 76% Wide Range
	or	≤ 0% Narrow Rang
d)	Unexplained Pressurizer Pressure Drop Of	≥ 200 psi

NOTE:

1. The boron concentration in the pressurizer should not be less than the concentration in the reactor coolant loops by more than 50 ppm. Use pressurizer spray to equalize concentration.

2. Charging flow to the RCS must be at the same boron concentration as that in the RCS.

3. A minimum seal injection flow of 6 gpm to each RCP must be maintained throughout this test.

4. The source range channels should be monitored closely during the course of this test.

5. Once the steam generators are isolated, steam generator pressures should not exceed 1025 psig.

6.1 Start visicorder traces and computer trend printout with trending of 5 minutes. _____

6.2 Shutdown reactor coolant pumps 1-1, 1-3 and 1-4.

RCP 1-1 _____
RCP 1-3 _____
RCP 1-4 _____

6.3 Isolate all four steam generators by closing the following valves:

	S/G 1-1	S/G 1-2	S/G 1-3	S/G 1-4
a) Main steam isolation valve (MSIV)				
	FCV 41 _____	FCV 42 _____	FCV 43 _____	FCV 44 _____
b) MSIV bypass valve				
	FCV 25 _____	FCV 24 _____	FCV 23 _____	FCV 22 _____
c) Main feedwater supply valve				
	FCV 510 _____	FCV 520 _____	FCV 530 _____	FCV 540 _____
d) Auxiliary Feedwater Supply Valves				
	LCV 106 _____	LCV 107 _____	LCV 108 _____	LCV 109 _____
	LCV 110 _____	LCV 111 _____	LCV 115 _____	LCV 113 _____
e) Blowdown isolation valve				
	FCV 760 _____	FCV 761 _____	FCV 762 _____	FCV 763 _____
f) Auxiliary feedwater steam supply valve FCV 95.				_____

	120 gpm	45 gpm
6.4 Verify charging and letdown is at the desired flow (record flows on Data Sheet #1). Flow will be maintained for approximately 30 minutes.	_____	_____
6.5 After approximately 15 minutes at this flow rate, request that incore thermocouple data be printed and attach to test procedure	_____	_____
6.6 Toward the end of the 30 minute period, instruct the NPO personnel to perform a shutdown margin calculation (STP R-19), and record the boron concentration used in the calculation.	_____ ppm	_____ ppm

NOTE: The boron concentration in the RCS should still be greater than 783 ppm. If not, use appropriate operating procedures to restore adequate shutdown margin.

6.7 Repeat steps 6.4 through 6.6 for a charging and letdown flow rate of 45 gpm. ____

6.8 Stop visicorder traces and trend computer printout and attach to test procedure. ____

6.9 Restart reactor coolant pump 1-1, 1-3, and 1-4 and reopen the main steam isolation valve, the auxiliary feedwater supply valve, and the blowdown isolation valve for each steam generator. Note: The order of restarting the reactor coolant pumps and opening of the valves will depend on RCS conditions and will be done in accordance with standard operating procedures. ____

6.10 Remove the safety injection signal blocks established in Appendix B unless required for the next step of Startup Procedure 40.0, "Program Outline Initial Core Loading, Initial Criticality, Zero Power Physics and Power Escalation." If the blocks are not removed, enter N/A. ____

6.11 Using the attached visicorder traces and/or trend computer printout, complete Data Sheet #1. ____

6.12 Align systems as required for the next step of Startup Procedure 40.0, "Program Outline Initial Core Loading, Initial Criticality, Zero Power Physics and Power Escalation". ____

7.0 ACCEPTANCE CRITERIA

7.1 The Acceptance Criteria of this test procedure shall be considered met when all steps of this procedure have been completed. ____

FIELD DATA SHEET #1

Pacific Gas and Electric Co.

Form 200

Station Diablo Canyon Unit 1 CVCS Charging and Letdown Cooldown Capability Year

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
									Initial			Final							
	Date	Time		Charging & Letdown Target Flow Rate (GPM)		Charging Flow Rate (GPM)	Letdown Flow Rate (GPM)		T Hot Leg (°F)	T Cold Leg (°F)	T Avg (°F)	T Hot Leg (°F)	T Cold Leg (°F)	T Avg (°F)	ΔT_{Avg} (°F)		$\Delta T_{Avg}/.5$ (°F/Hr)		
				120								-	-	-	-				
				120					-	-	-								
				45								-	-	-	-				
				45					-	-	-								

Remarks: Temperature Data is from Loop 2

TEST INSTRUMENT LIST

SHEET _____ OF _____

STARTUP T.P./REV. _____

UNIT _____

NO	INSTRUMENT	RANGE	ACCURACY	I.D. NO.	INSTR. CAL. VERIFIED		CAL. DUE DATE	STEPS USED IN	COMMENTS	REMOVED
					DATE	BY				

APPENDIX A

Technical Specifications Exceptions

The table below identifies those technical specification items which are temporarily bypassed or require special test exceptions to the limiting conditions for operation during the performance of this and all other special tests.

TECHNICAL	SPECIFICATION	44.1					44.2	44.3
		1.1	1.2	1.3	1.4	1.5		
2.1.1	Safety Limits	X	X	X	X	X		
3.1.1.3	Moderator Temperature Coefficient					X		
3.1.1.4	Minimum Temperature for Criticality					X		
3.3.1	Various Reactor Trips							
	Overtemperature ΔT	X	X	X	X	X		
	Overpower ΔT	X	X	X	X	X		
3.3.2	Safety Injection							
	All Automatic Functions	X	X	X	X	X		
3.4.1	Reactor Coolant Loops							
	Normal Operation	X	X	X	X	X		
3.4.4	Pressurizer		X	X				X
3.7.1.2	Auxiliary Feedwater Sys.				X			X
3.8.1.1	A. C. Sources				X			
3.8.2.1	Onsite Power							
	A. C. Distribution				X			X
3.8.2.3	Onsite Power							
	D. C. Distribution				X			X

APPENDIX B

ENGINEERED SAFETY FEATURES AND REACTOR PROTECTION MODIFICATIONS

During the performance of these tests, modifications will be made to the Engineered Safety Features and the Reactor Protection systems. The systems will operate as specified below.

A. All automatic Safety Injection (SI) functions, except reactor trip, will be blocked. A Safety Injection actuation signal will result in the following:

1. Reactor Trip
2. Control Room Trip Indication and Alarms

B. Safety Injection actuation can be initiated by manual switch operation.

C. Overtemperature ΔT and Overpower ΔT Reactor Trip signals will be blocked.

The specific method to implement the above modification is presently being formulated..